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Experimental Investigations of the Typology of Presupposition Triggers

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ABSTRACT

The behaviour of presupposition triggers in human language has been extensively studied and given rise to many distinct theoretical proposals. One intuitively appealing way of characterising presupposition is to argue that it constitutes backgrounded meaning, which does not contribute to updating the conversational record, and consequently may not be challenged or refuted by discourse participants. However, there are a wide range of presupposition triggers, some of which can systematically be used to introduce new information. Is there, then, a clear psychological distinction between presupposition and assertion? Do certain expressions vacillate between presupposing and asserting information? And is information backgrounding a categorical or a gradient phenomenon? In this paper we argue for the value of experimental methods in addressing these questions, and present a pilot study demonstrating backgrounding effects of presupposition triggers, and suggesting their gradience in nature. We discuss the implications of these findings for theoretical categorisations of presupposition triggers.

Keywords: presuppositions; accommodation; experimental pragmatics; information structure; QUD.

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Introduction

In conversation, information is exchanged in several different ways. One dimension of variation concerns the foregrounding and backgrounding of information. A speaker may introduce information that is available for the other conversational participants to accept or reject, and at the same time introduce other information that is in some sense ‘taken for granted’, which is typically not available for discussion. The former class of information is considered “foregrounded” and the latter “backgrounded”.

Natural languages provide various devices to allow speakers to manipulate information structure in this way. These include lexical items such as *stop*, *only*, *manage*, *again*, and so on; and syntactic devices such as cleft constructions. For example, the speaker of (1) is understood to foreground the prediction that Balotelli will start the match (a point that invites potential disagreement), while describing him in the backgrounded content as an “outstanding striker” (in a way that does not invite disagreement). Similarly, the speaker of (2) foregrounds the prediction that Balotelli will be sent off, backgrounding the information that this has happened before.

- (1) Balotelli, who is an outstanding striker, will start the match.
- (2) Balotelli will be sent off again.

From a theoretical perspective (both philosophical and linguistic), various attempts have been made to characterise the difference between the foregrounded and backgrounded content of sentences. One influential approach asserts that the foregrounded meaning is that which contributes to context update (Stalnaker, 1976; Lewis, 1979) and addresses the Question Under Discussion (QUD; Roberts, 1996). However, the appropriate treatment of backgrounded content is relatively unclear, due to a great extent to the heterogeneity of this type of content.

From the perspective of experimental semantics and pragmatics, this issue invites empirical attack. Despite the intuitively appealing nature of the theoretical analysis, there is as yet little evidence that the distinction between foregrounded and backgrounded content is a psychologically real one for native speakers of a language. In particular, one might question whether these are the appropriate levels of description, or whether the heterogeneity of backgrounded content is also reflected at a psycholinguistic level. We can consider whether types of linguistic content that admit a unified theoretical

analysis also exhibit a comparable level of unity when they are used to elicit behavioural data from linguistically untrained participants (and conversely whether theoretically distinctive materials yield unexpectedly similar behavioural signatures). We wish to know, broadly speaking, whether the various ways of manipulating information structure (distinguished from one another on theoretical or philosophical grounds) actually differ from one another at a psychological or behavioural level.

Recent work in experimental pragmatics has attempted to apply some of the psycholinguistic techniques used in research on implicature (Bott & Noveck, 2004, among many others) to the problem of information structure. In particular, attention has focused on presupposition triggers, with respect both to their ability to background information and their ability to “project” semantic content. This study examines the former attribute, but both are discussed in the following section.

1. Presupposition phenomena in experimental semantics and pragmatics

Lexical items such as *again*, *stop*, and so on are customarily analysed as presupposition triggers. These have two distinctive properties: first, as discussed above, they tend to signal the presence of further meaningful content (the “presupposition”), additional to the main declarative meaning of the sentence, but intuitively less available for further discussion, e.g. for direct refutation. Secondly, unlike other forms of additional meaning such as (most) implicatures, presuppositions survive embedding under negation and other operators among the “family of sentences” tests (Chierchia & McConnell-Ginet, 1990), while the declarative meaning does not. If we negate (2), as in (3), the presupposition (that Balotelli has been sent off in the past) remains intact. This is referred to as the presupposition “projecting” from under the scope of negation.

- (3) Balotelli will not be sent off again.

These two properties have given rise to rich sets of competing theoretical proposals. With respect to projection, the question arises of how the presuppositions of a complex sentence are calculable from the presuppositions of the component sentences. At least two classes of theories have been advanced to account for this: the dynamic semantic approach advanced by

Heim (1983) and Van der Sandt (1992) aims to explain projection in terms of semantic composition, while the pragmatic approach endorsed by Schlenker (2008) appeals to principles of conversational organisation.

The involvement of experimental work in addressing this question parallels the developments in the study of scalar implicature over the past 10 years. As in that case, competing theories can no longer be evaluated on the basis of introspection, as there is little controversy about the ultimate interpretation of the examples under discussion (Katsos & Cummins, 2010). The theories are instead distinguishable by the fact that they posit different processes, and therefore make distinctive predictions about the time-course of processing. For instance, in a case such as (4), it is not controversial that the presupposition (5) does not ultimately project, but it is also not introspectively clear whether the presupposition is calculated and then cancelled, or simply not calculated.

- (4) I didn't know that whales are fish, because whales are not fish.
- (5) Whales are fish.

For similar reasons, experimental work has recently commenced on the question of how presuppositions are backgrounded. An intuition is broadly shared in the literature that presupposed content is generally not addressable: that is, it is not possible for an interlocutor straightforwardly to object to a presupposition. Instead, infelicitous presuppositions must be dealt with in a more metalinguistic way, e.g. by objecting to the utterance as a whole. This observation underlies the “Hey, wait a minute” test (Shanon, 1976; von Stechow, 2004). This test is proposed on the basis that presuppositions not in the common ground can be challenged as in (6), while assertions not in the common ground cannot.

- (6) A: John realised that whales are fish.
B: Hey, wait a minute! Whales are not fish.
*B: Hey, wait a minute! John didn't realise that.

However, the “Hey, wait a minute” test may not be the most sensitive diagnostic for presupposition *per se*; it seems felicitous to use “Hey, wait a minute” to object to any precondition of the utterance, no matter how obscure (and perhaps even to an aspect of foregrounded meaning, if it is particularly surprising). Moreover, there are good reasons to suppose that the delineation

of backgrounded and foregrounded content is not entirely straightforward. First, presuppositions differ in their logical relation to the content of the sentence (Zeevat, 1992), which could have implications for their addressability. Second, many researchers have observed differences in the family of presupposition triggers, e.g. between “soft” and “hard” triggers (Abusch, 2010), or have proposed a continuum ranging from structural “hard-core” triggers like clefts to “heavily context-dependent presuppositions” not associated with any particular trigger (Kadmon, 2001). Third, presuppositions can be exploited to convey information in an assertion-like fashion, i.e. to introduce new information through accommodation (Lewis, 1979; Von Stechow, 2000). Consequently, the relation between the two aspects of presupposition discussed above – the potential for presuppositional content to project, and its tendency to be informationally backgrounded – is not a trivial one.

We discuss these issues in the following subsections of this paper, and then proceed to motivate and discuss a pilot study that aims to investigate the typology of presupposition triggers with respect to their backgrounding behaviour. In this case, the broad justification for experimental work is that subtle gradations in the acceptability of forms may exist but not be available to introspection. Our aim is to test the psychological reality of the distinctions that are posited.

2. Resolution and lexical triggers

Zeevat (1992) observed that presupposition triggers could be categorised into three broad classes, differing in the extent to which they are anaphoric (following Van der Sandt 1988). One class of triggers, including for instance definite descriptions, “collect entities from the environment in order to say new things about them” (Zeevat, 1992, p. 397). By analogy with the process of anaphora resolution, these are referred to as *resolution triggers*. The second class of triggers, termed *lexical triggers* by Zeevat, are lexical items that encode preconditions for their main declarative content. *Stop* and *continue* both have this property: in (7) and (8), it is logically necessary that John smoked at some point prior to the time of utterance.

- (7) John stopped smoking.
- (8) John continues to smoke.

The third class, typified by *too* and *again*, is also anaphoric, in that it involves the retrieval of an entity or eventuality previously salient in the discourse. Deviating from Zeevat's use of the term, we will consider these also to be "resolution triggers". Note in particular that the backgrounded content of such items is typically unrelated, logically speaking, to the foregrounded content. For instance, in (2) and (3), the backgrounded content (that Balotelli was sent off at some time in the past) neither entails nor is entailed by the foregrounded content (Balotelli being sent off in the past is neither a necessary nor a sufficient condition for him to be sent off in the future). Contrastingly, in (7) and (8) the relation between foregrounded and backgrounded content is closer, as each may only end or prolong a preceding eventuality.

It is theoretically coherent to assume that all these categories of presuppositions behave in the same way, in respect of the foregrounding and backgrounding of information. However, intuitively, there appear to be important differences as regards the addressability of the presupposed content. For the resolution triggers, denial of the backgrounded content does not provide any information about the foregrounded content. For the lexical triggers, denial of the backgrounded content amounts to denying the truth of the statement as a whole. Therefore, it should be possible to address the presupposed content while at the same time addressing the QUD, in Roberts's (1996) terms¹.

The question of whether there are psychologically real differences between the treatment of resolutional and lexical triggers by native speakers is an empirical one. A binary judgment such as the "Hey, wait a minute" test obviously does not distinguish different levels of backgrounding. From an experimental point of view, this suggests a role for a gradient acceptability judgement task, such as we use in the pilot study presented later in this paper².

3. Different strengths of presupposition trigger

Several strands of research on presupposition share the intuition that there are further systematic differences that are not necessarily coterminous with the

¹ Note that to Roberts, addressing the QUD involves entailing an answer to it, but no stipulation is made as to how direct this entailment relation must be.

² We avoid using the "Hey, wait a minute" test in conjunction with a gradient judgment task, as there is a risk that the judgments will reflect the acceptability of using this particular kind of objection in different contexts, rather than being a direct measure of backgrounding.

above classes. Kadmon (2001) argues for a continuum of presuppositions, based on their projection behaviour (and specifically considerations such as cancellability and context-dependence). Von Stechow and Matthews (2008) consider certain triggers, such as *too* and *again*, to be more strongly presuppositional than others. They situate this observation in the context of research by Abusch (see Abusch, 2010), proposing a distinction between “soft” and “hard” presupposition triggers, and Simons (2006), who argues that *too* and *again* serve no purpose within the sentence other than triggering a presupposition (which suggests that their presence should be a reliable cue to the presupposition being intended by the speaker).

It is tempting to interpret this as a prediction that the strongest presupposition triggers should have the most pronounced backgrounding effects. However, this may be a misinterpretation. In fact, one might argue instead that the use of a sentence that goes out of its way explicitly to convey a presupposition should render that presupposition more addressable, in that its importance is heightened by comparison with the declarative content of the sentence.

Once again, the role of experimental work here is to discern whether the intuitions of theoreticians have a psychological reality. We share the intuition that the class of presuppositions is diverse, both in respect of the nature of the material presupposed and in the extent to which that material is made cognitively salient, and consider that information structure is a useful measure of this. Our hope in this respect is that findings about the nature of backgrounding may enable us to help further refine the typology of presupposition triggers that has been proposed in the theoretical literature.

4. Exploiting accommodation

Another aspect of presupposition behaviour is that presuppositions can be used to convey additional information. When a sentence felicitously presupposes information that is not taken for granted in the context, that information is said to be *accommodated* (Lewis, 1979, drawing upon the work of Stalnaker 1976 i.a.). The possibility of exploiting accommodation to convey new information further blurs the distinction between foregrounded and backgrounded content. Consider for example (9).

- (9) I just found out that John is having an affair.

In terms of information structure, this sentence declares the fact of discovery ('I just found out that p ') and presupposes the proposition 'John is having an affair'³. However, intuitively, sentences such as (9) can also be used to assert the propositional content that appears to be presupposed. Moreover, felicitous responses to (9) appear more naturally to address that proposition than the overt declarative ("He isn't!" seems a more likely response than "You didn't!") In short, the presupposition does not appear to be backgrounded to any appreciable extent in such a construction.

Conversely, presuppositions can in principle be exploited to convey information that is controversial, with a view to adding this information to the common ground or causing the hearers to update their situation model accordingly. This is exploited in loaded questions, such as the classic example (10), where either a 'yes' or 'no' response can be taken to endorse the presupposition of 'stop'. Unlike examples such as (9), however, this technique exploits the fact that the presupposition is backgrounded, and is therefore difficult to address.

(10) Have you stopped beating your wife yet?

A general question here relates to how regularly speakers intend presuppositions to be accommodated: here we might make competing theoretical observations. On the one hand, the use of a presupposition is informationally redundant unless it goes to updating the situation model of the interlocutors in some way⁴. We might therefore expect that non-lexical triggers are canonically used to convey new information of some kind (e.g. *again* to convey explicitly that the event under discussion has happened before). On the other hand, if it is crucial that new information should be added to the interlocutors' situation model, it might appear uncooperative for a speaker to convey this information in the form of a presupposition, where it cannot be easily contested if it is controversial, and where it might conceivably be overlooked entirely. This raises the very broad and much-discussed issue of how a speaker most efficiently conveys information to a hearer, and the specific question of how presuppositions enter into this process.

³ This is assumed to be a presupposition based on projection, specifically that "I didn't just realise John is having an affair" also conveys that he is.

⁴ This might include bringing already known information more immediately to the attention of the interlocutor.

For the purpose of this research, the crucial point here is that the role of presupposition triggers in backgrounding information is potentially negotiable. It appears quite possible for theoretically similar constructions either to background the presupposition or to foreground it at the expense of the declarative content. This suggests that we should also be interested in case-by-case variation among instances of identical triggers, as well as being concerned with the patterns that arise across the class(es) of triggers.

5. Foregrounded and backgrounded presuppositions: a pilot experimental study

In our pilot study, we aimed to investigate the extent to which a set of presupposition triggers accomplish the backgrounding of their corresponding presuppositions. We selected as a sample of triggers the resolutive *again*, and the lexical *stop* and *continue*. We also considered *only*, a trigger with debatable status (presupposition or entailment; cf. Horn, 1969; 1996, Roberts to appear); and a syntactic resolution trigger, the comparative construction, using which for instance the sentence (11) presupposes (12)⁵.

- (11) Jane is a better doctor than Mike.
- (12) Mike is a doctor.

5.1. Methodology

Participants were presented with question-answer (Q-A) pairs and asked to rate, on a 1-5 scale, “how natural” the answer was. Response latencies were also measured and recorded. In the critical items, a presupposition trigger appears in the question, and the question was answered in the negative. In the “Foreground” condition, the negative answer addressed the foregrounded content of the question, as in (13); in the “Background” condition, the negative answer addressed the backgrounded content of the question, as in (14).

- (13) Q: Did Julia stop smoking?
A: No, she smokes.

⁵ This also projects from under the scope of negation: “Jane isn’t a better doctor than Mike” conveys that Mike is a doctor.

- (14) Q: Did Julia stop smoking?
A: No, she didn't use to smoke.

For each trigger, two Q-A pairs were administered to each subject. Two versions of the experiment were constructed, such that the items presented in the Foreground condition in version 1 were presented in the Background condition in version 2, and vice versa. The experiment was implemented in E-Prime. Participants (n=30) were native English speakers, recruited from the student body of the University of Cambridge, and were allocated randomly to either version 1 or version 2 of the experiment.

5.2. Predictions

Our general predictions are as follows. If native speakers are sensitive to the distinction between foregrounded and backgrounded information in discourse, Q-A pairs in the Foreground condition should receive higher naturalness ratings than those in the Background condition. Moreover, under the assumption that backgrounded information is harder to retrieve, we would predict a slowdown in response time (while we measure response time of the judgment, admittedly a more natural measure would be response time of the reading time of the critical segment). Comparing the resolitional to the lexical triggers, we would expect the acceptability of negating backgrounded information in the latter case to be higher than in the former case, as for lexical triggers the presupposition is entailed by the declarative content of the sentence, and therefore its failure is sufficient reason to give a felicitous negative response to the sentence.

5.3. Results

Results for the triggers *continue*, *stop* and *only* are as follows. As the materials with *again* and the comparative gave rise to unintended ambiguities in one test condition in this pilot study⁶, we are unable to report counterbalanced results for these triggers. The following results are based upon each participant's

⁶ The problematic sentences described two individuals of the same gender; in these cases, as well as a reading of 'he' or 'she' in which the presupposition was contested, there was a possible reading in which the declarative content was contested.

rating of two items for each trigger, both with either foreground continuations (for 15 participants) or background continuations (for the other 15).

Trigger	Mean rating (SD)		Mean response time, ms (SD)	
	Foreground	Background	Foreground	Background
Again	4.13 (0.97)	2.87 (1.11)	4509 (2906)	4052 (3268)
<i>comparative</i>	4.37 (1.00)	2.60 (0.77)	3460 (2006)	4464 (3080)

These preliminary results show that, as predicted, refutations in foreground conditions are preferred to those in background conditions for each type of presupposition trigger. Paired t-tests applied to the counterbalanced conditions reveal a highly significant preference in judgements for foreground rather than background conditions (all $p < 0.001$). Similar planned comparisons using paired t-tests for response times also show a preference for foreground conditions over background (*continue*, $t = 1.68$, $p < 0.05$; *stop*, $t = 2.40$, $p < 0.01$; *only*, $t = 3.55$, $p < 0.001$; all one-tailed).

Between triggers, comparisons show a significant preference in the background condition for *only* versus *stop* ($t = 3.46$, $p < 0.001$ two-tailed) and for *only* versus *continue* ($t = 3.08$, $p < 0.01$ two-tailed). However, these preferences are also significant in the foreground condition, as is the preference for *continue* versus *stop* which does not approach significance in the background condition (*only* versus *stop*, $t = 5.48$, $p < 0.001$ two-tailed; *only* versus *continue*, $t = 2.77$, $p < 0.01$ two-tailed; *continue* versus *stop*, $t = 2.70$, $p < 0.01$ two-tailed). Each of these comparisons remains significant at $p < 0.05$ with a Bonferroni correction for multiple comparisons.

Note that the reaction times exhibit a great deal of variability, possibly because these also include reading times. There is a numerical preference for foreground conditions; the exception is *again*, but this may reflect the failure to counterbalance materials in this condition.

5.4. Discussion

The results of this pilot study demonstrate that native speakers are sensitive to the distinction between foregrounded and backgrounded information, and that this is accessible to a methodology involving naturalness ratings of dialogue fragments. Conditions in which backgrounded information was refuted were

perceived as less felicitous than those in which foregrounded information was refuted. For the counterbalanced test items, foreground conditions also yielded significantly faster response times. This suggests that the retrieval of backgrounded information, which is not being used actively to update the conversational record, may result in additional processing load.

There is also considerable variability between triggers as to the acceptability of refuting backgrounded content. Our results suggest that this is significantly easier in the case of *only* than *continue* or *stop*, with *again* and the comparative construction yielding numerically intermediate acceptability ratings. This might be taken as support for the psychological reality of the distinction between resolution and lexical triggers.

Two important caveats must be taken into account, however, in attempting to interpret these findings. First, as discussed above, the status of the prejacent of *only* (e.g. the proposition *John went to the library* in the sentence *Only John went to the library*) is a theoretically-contested issue. The acceptability ratings of *only* in the background condition could be interpreted as providing support for the view that the prejacent is an entailment of *only* (cf. Horn, 1996 and Roberts, to appear).

Secondly, and more problematically, the differences that were manifest in the Background conditions were also exhibited in the Foreground conditions, in violation of our expectations. This renders any conclusion about the relative behaviour of the presupposition triggers in this experiment necessarily very tentative. It could be that the apparent disparity between these conditions is attributable simply to the materials in question varying in felicity, which might apply to both experimental conditions. An alternative conjecture is that the Foreground materials were not optimally felicitous because it is more natural to respond to a presupposition-triggering question with a response that also acknowledges the presupposition than with one that does not: compare for instance (15) and (16). In this case, the infelicity of the Foreground items might be independent of the Background items, and thus would not invalidate the comparison between presupposition triggers discussed above.

- (15) Q: Did Julia give up smoking?
A: [?]No, she smokes.

- (16) Q: Did Julia give up smoking?
A: No, she still smokes.

In our ongoing work, we are addressing this issue, with a view to obtaining a suitable baseline for comparing the backgrounding behaviour of presuppositions (by constructing refutations that are reliably judged to be entirely felicitous).

6. General discussion and future directions

In this paper, we have aimed to give show the potential of experimental work to shed light on theoretically-contested aspects of information structure in general, and presupposition in particular. It must be acknowledged that this is a complex phenomenon, as witnessed both by the extensive theoretical literature and the relatively late development of experimental approaches to the problem. The above pilot study illustrates both some of the potential of empirical work to demonstrate the psychological reality of the distinctions posited by theoreticians, and some of the difficulties encountered in attempting to operationalise these distinctions in a meaningful way. Our study illustrates the difficulty in isolating presuppositions from other types of content in actual interpretation, and the individual variability among presupposition triggers that seems to elude neat theoretical groupings. Empirical work in this field has the potential to throw light on whether the classes of presuppositions posited in some approaches (e.g. Zeevat, 1992) are coherent, or whether it is more appropriate to situate presuppositions on a continuum (as in Kadmon, 2001). In either case, a further question concerns the status of presupposition phenomena as a potential semantic universal (cf. Von Stechow & Matthews, 2008). The results from experimental research have shown that fine-grained judgements about types of presupposed content cannot be obtained solely from introspection. On the surface, it appears that presuppositions can take many different forms and be related to the declarative content of their triggering sentences in various different ways. If it is true that presuppositions can be organised cross-linguistically into a small set of natural kinds with a consistent behaviour, that is potentially instructive for our view of conversational interaction and indeed cognition. We hope to contribute to the cross-linguistic empirical examination of presupposition and information backgrounding in future work.

We also hope to unify this work with research on some of the other open questions about presupposition discussed in this paper. For instance, presupposition projection is plausibly linked to information backgrounding:

we have seen how information may be presented at different levels of ‘grounding’ in order to achieve particular cognitive effects. The question of how this aspect of information structure is used to influence the interlocutor’s situation model does not appear to have been tackled in any generality. Nevertheless, there is a strong and widely-shared intuition that presuppositions may be used to introduce information into the discourse. By better understanding how presupposition triggers are processed by speaker and hearer, we will better be able to offer an account of the role of presupposition in efficient communication. Appeal to experimental data should enable research in this field to proceed within a constrained and tractable hypothesis space.

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